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ENERGY BLUEPRINT 1980

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Glossary

INTRODUCTION

B.C. Hydro has the obligation to provide the energy needs of most of the people of British Columbia. It's a challenging task, and we thought you would like to know something of the problems involved and how we go about solving them.

Forecasting future energy requirements is a complex business calling for load forecasting, long range planning and the construction as required of major projects.

The task is complicated by the changing energy requirements of our customers and the fact that it takes 10 or more years to plan and construct new major facilities. Therefore each year Hydro produces a plan which covers the next decade.

This booklet is an outline of the 1980 plan for the 10-year period to 1990, and seeks to explain what energy sources are being studied and how we expect to finance projects.

If you require any further information, please contact B.C. Hydro and Power Authority, Public Affairs Division, 970 Burrard Street, Vancouver, B.C. V6Z 1Y3

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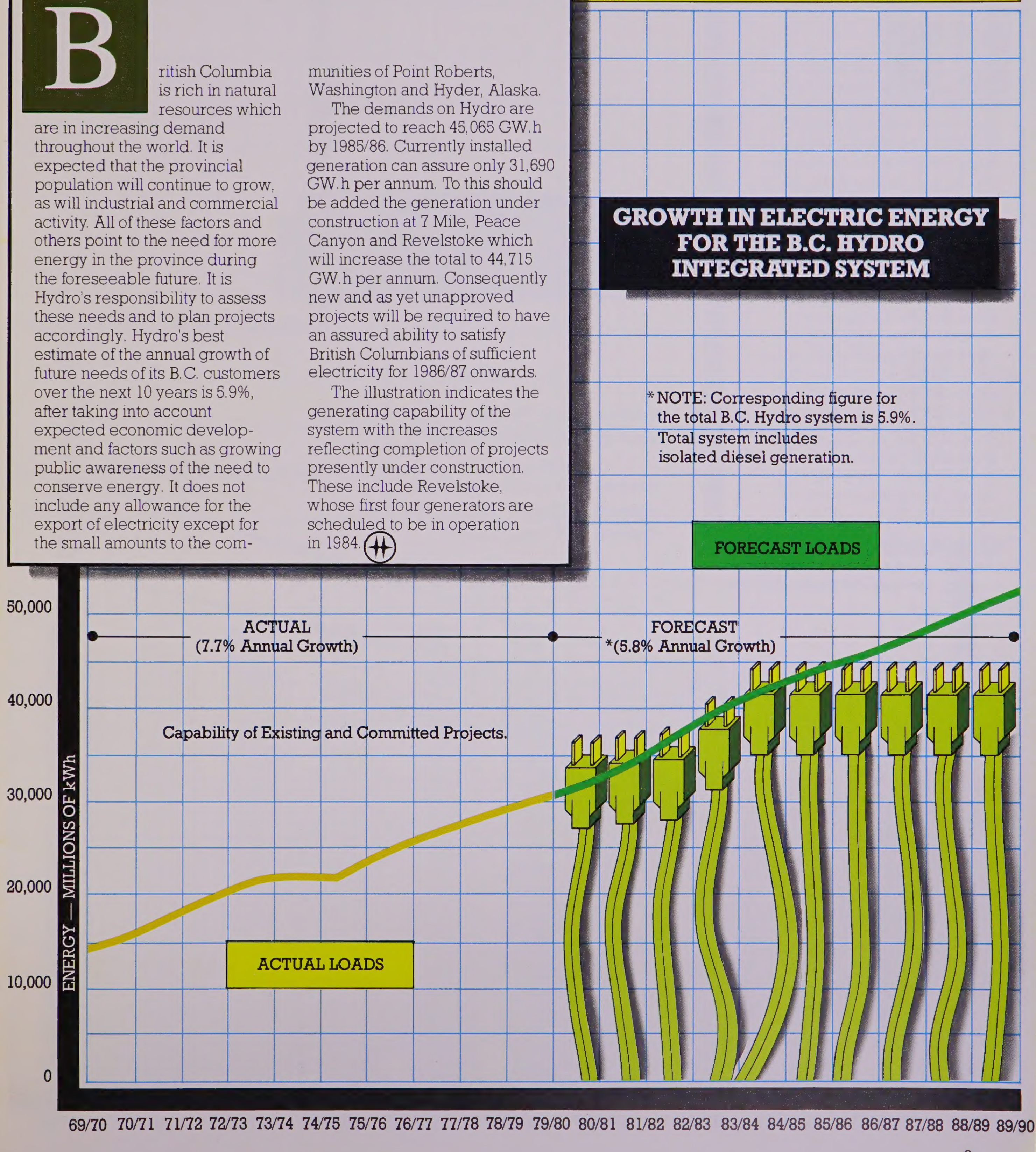
B.C.'s NEEDS — THE LOAD FORECAST

British Columbia is rich in natural resources which are in increasing demand throughout the world. It is expected that the provincial population will continue to grow, as will industrial and commercial activity. All of these factors and others point to the need for more energy in the province during the foreseeable future. It is Hydro's responsibility to assess these needs and to plan projects accordingly. Hydro's best estimate of the annual growth of future needs of its B.C. customers over the next 10 years is 5.9%, after taking into account expected economic development and factors such as growing public awareness of the need to conserve energy. It does not include any allowance for the export of electricity except for the small amounts to the communities of Point Roberts, Washington and Hyder, Alaska.

The demands on Hydro are projected to reach 45,065 GW.h by 1985/86. Currently installed generation can assure only 31,690 GW.h per annum. To this should be added the generation under construction at 7 Mile, Peace Canyon and Revelstoke which will increase the total to 44,715 GW.h per annum. Consequently new and as yet unapproved projects will be required to have an assured ability to satisfy British Columbians of sufficient electricity for 1986/87 onwards.

The illustration indicates the generating capability of the system with the increases reflecting completion of projects presently under construction. These include Revelstoke, whose first four generators are scheduled to be in operation in 1984.



GROWTH IN ELECTRIC ENERGY FOR THE B.C. HYDRO INTEGRATED SYSTEM

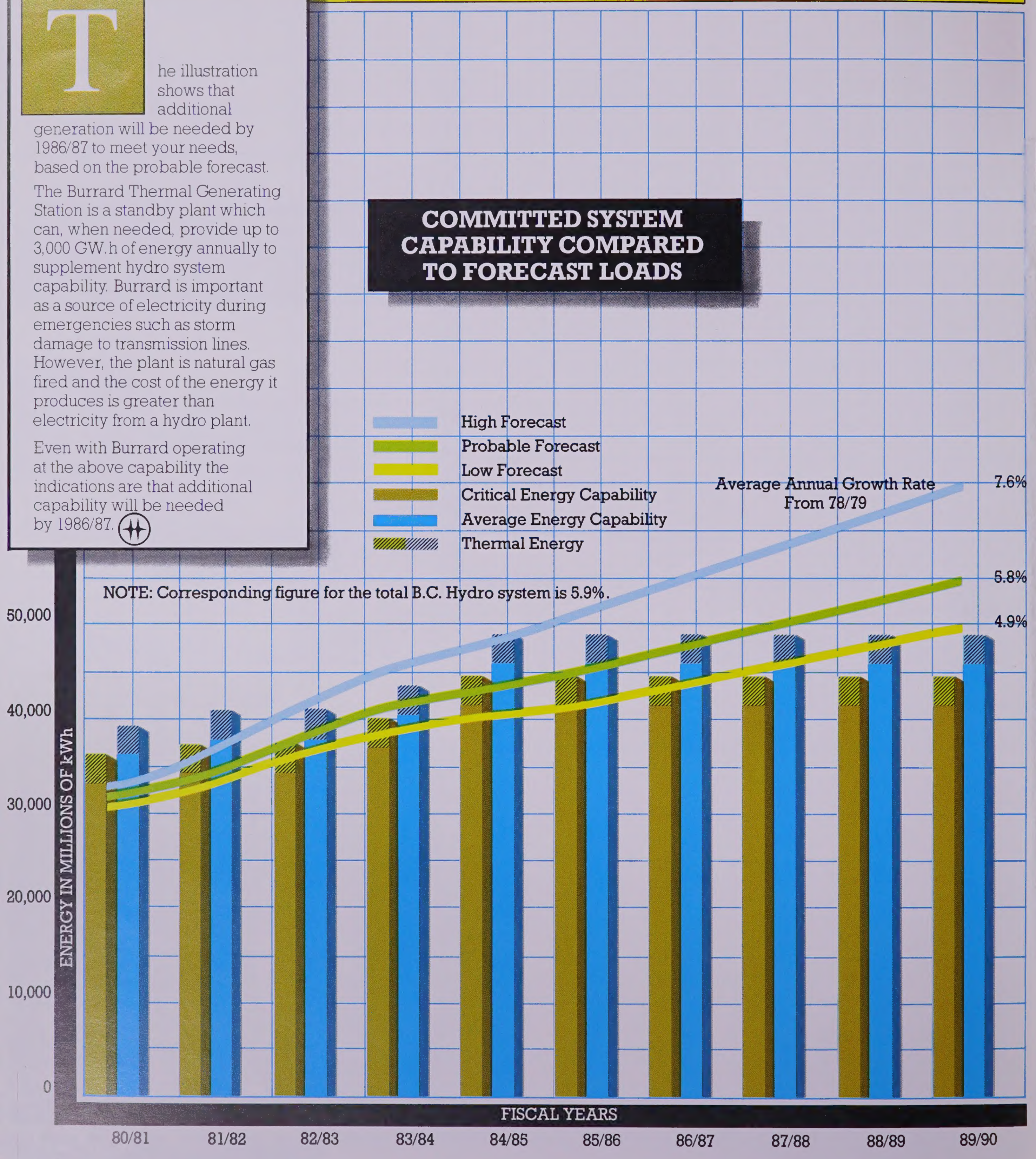
* NOTE: Corresponding figure for the total B.C. Hydro system is 5.9%. Total system includes isolated diesel generation.

THE SITUATION TODAY

The illustration shows that additional generation will be needed by 1986/87 to meet your needs, based on the probable forecast.

The Burrard Thermal Generating Station is a standby plant which can, when needed, provide up to 3,000 GW.h of energy annually to supplement hydro system capability. Burrard is important as a source of electricity during emergencies such as storm damage to transmission lines. However, the plant is natural gas fired and the cost of the energy it produces is greater than electricity from a hydro plant.

Even with Burrard operating at the above capability the indications are that additional capability will be needed by 1986/87.

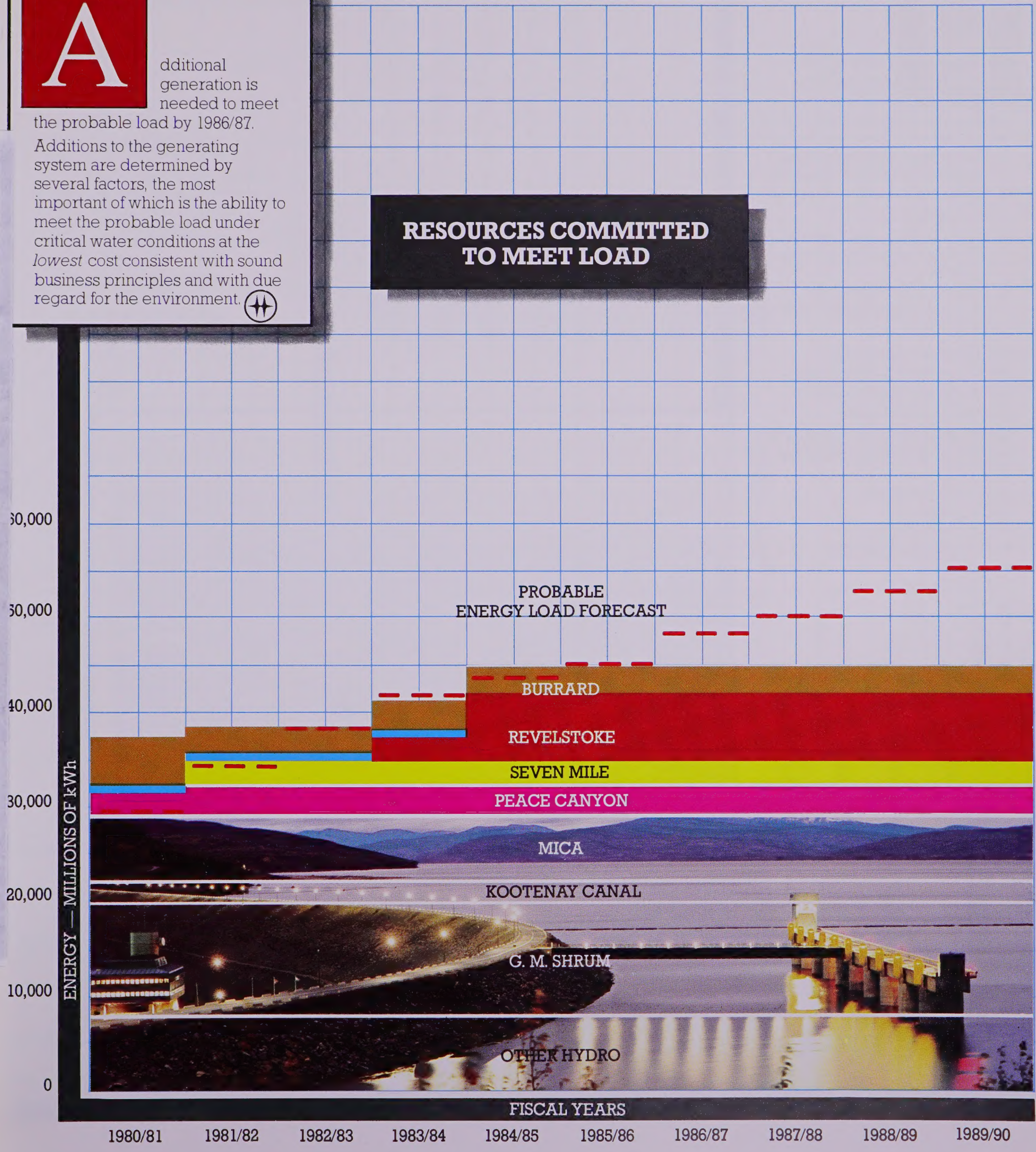

COMMITTED SYSTEM CAPABILITY COMPARED TO FORECAST LOADS

NOTE: Corresponding figure for the total B.C. Hydro system is 5.9%.

COMMITTED RESOURCES

Additional generation is needed to meet the probable load by 1986/87.

Additions to the generating system are determined by several factors, the most important of which is the ability to meet the probable load under critical water conditions at the *lowest* cost consistent with sound business principles and with due regard for the environment.



ALTERNATIVES

Hydro's future generating options are confined to those energy sources which have four basic attributes:

1. The energy source must be available in British Columbia;
2. It must have a well-developed technology;
3. The cost must be competitive with other available energy sources;
4. It must be acceptable to the Provincial Government and the public.

Within these parameters, Hydro's options are primarily hydroelectric and coal-fired thermal developments.

Under study, but not yet able to meet B.C. Hydro's criteria for viability:

- Geothermal power
- Solar heating
- Photovoltaic cells
- Solar thermal electric
- Conversion
- Wind energy
- Tidal power
- Wave power
- Ocean currents
- Thermal gradients
- Biomass energy
- Coal gasification
- Fluidized bed combustion
- Magnetohydrodynamics
- Energy storage methods

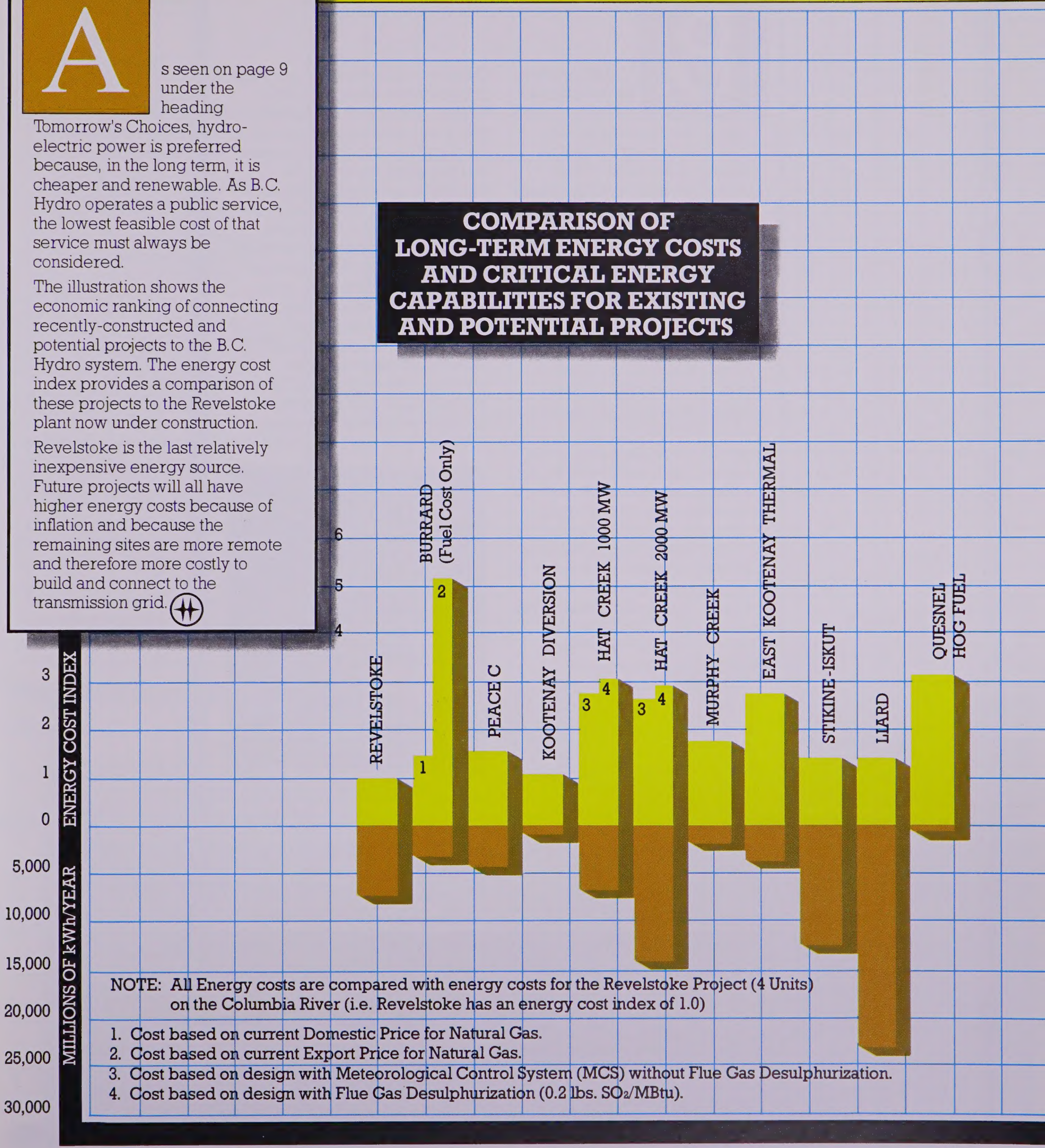
B.C. Hydro's new research and development facility in Surrey.

WHY HYDROELECTRIC IS PREFERRED

As seen on page 9 under the heading Tomorrow's Choices, hydroelectric power is preferred because, in the long term, it is cheaper and renewable. As B.C. Hydro operates a public service, the lowest feasible cost of that service must always be considered.

The illustration shows the economic ranking of connecting recently-constructed and potential projects to the B.C. Hydro system. The energy cost index provides a comparison of these projects to the Revelstoke plant now under construction.

Revelstoke is the last relatively inexpensive energy source. Future projects will all have higher energy costs because of inflation and because the remaining sites are more remote and therefore more costly to build and connect to the transmission grid.



COMPARISON OF LONG-TERM ENERGY COSTS AND CRITICAL ENERGY CAPABILITIES FOR EXISTING AND POTENTIAL PROJECTS

NOTE: All Energy costs are compared with energy costs for the Revelstoke Project (4 Units) on the Columbia River (i.e. Revelstoke has an energy cost index of 1.0)

1. Cost based on current Domestic Price for Natural Gas.
2. Cost based on current Export Price for Natural Gas.
3. Cost based on design with Meteorological Control System (MCS) without Flue Gas Desulphurization.
4. Cost based on design with Flue Gas Desulphurization (0.2 lbs. SO_2/MBtu).

B.C. HYDRO'S EXPORT POLICY

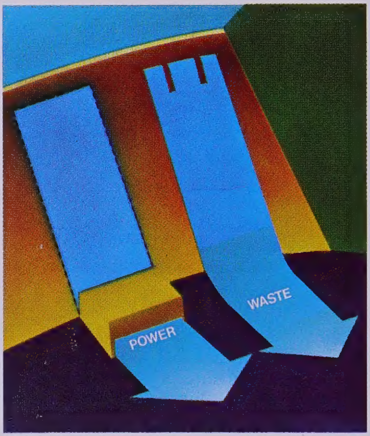
B.C. Hydro plans its construction program on the basis of meeting your energy requirements and the system being able to produce the required electric energy during critical water years.

In years of average or above average water conditions, there will be surplus water and consequently more electric generating capability than is needed in B.C. When this happens and markets exist in Canada and the U.S., it makes sense to sell surplus energy rather than waste it by spilling water over the dams.

Exporting surplus electricity is a source of additional revenue that reduces the impact of future cost increases of electricity to our customers by helping to finance future projects. Also, it reduces Canada's current account deficit by bringing U.S. dollars into the country. This is good business all around, especially since the costs incurred in exporting surplus hydro energy are negligible.

An important finding by the National Energy Board at the end of the January 1980 hearings of B.C. Hydro's application for new export licences was that it was satisfied that B.C. Hydro "has not constructed, is not constructing and is not operating its system differently because of exports".

The NEB stated in its Reasons for Decision concerning the granting of new export licences to B.C. Hydro: "The Board is satisifed that it is an inherent characteristic of electric power systems that there will inevitably be periodic surpluses of capacity because new generating plants can be added only in discrete increments. In addition, the utility must plan to meet the maximum probable load under the worst forecast supply circumstances, so that there is a surplus of capacity and/or energy at all times when these extreme conditions do not prevail. This is particularly true in a system such as that of B.C. Hydro which is predominantly hydroelectric".



"The Board accepts the applicant's contention that the denial of licences to export surplus power would decrease revenues and increase the cost of power to domestic customers with no offsetting benefit".

THE PLAN TO MEET YOUR NEEDS

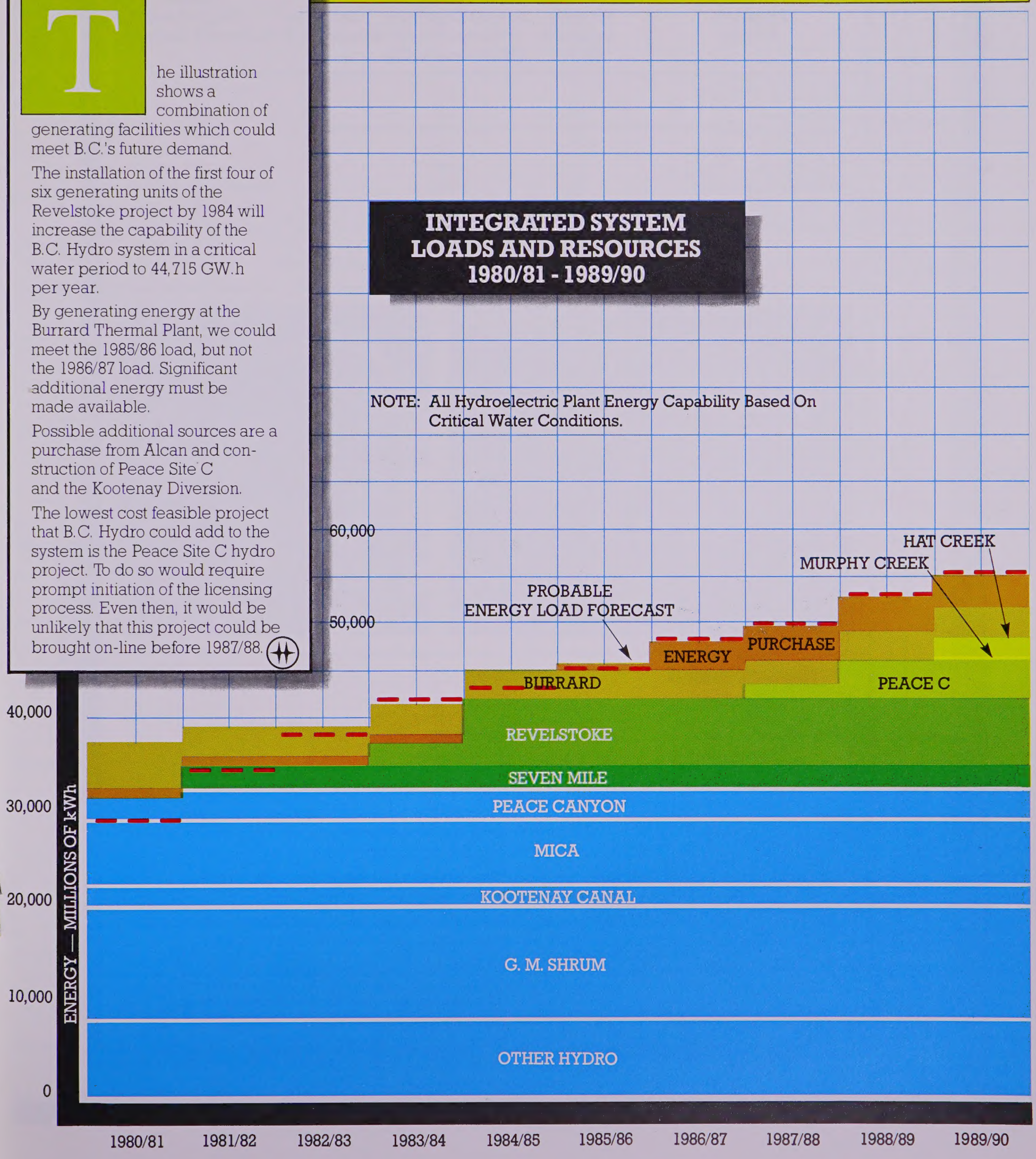
The illustration shows a combination of generating facilities which could meet B.C.'s future demand.

The installation of the first four of six generating units of the Revelstoke project by 1984 will increase the capability of the B.C. Hydro system in a critical water period to 44,715 GW.h per year.

By generating energy at the Burrard Thermal Plant, we could meet the 1985/86 load, but not the 1986/87 load. Significant additional energy must be made available.

Possible additional sources are a purchase from Alcan and construction of Peace Site C and the Kootenay Diversion.

The lowest cost feasible project that B.C. Hydro could add to the system is the Peace Site C hydro project. To do so would require prompt initiation of the licensing process. Even then, it would be unlikely that this project could be brought on-line before 1987/88.



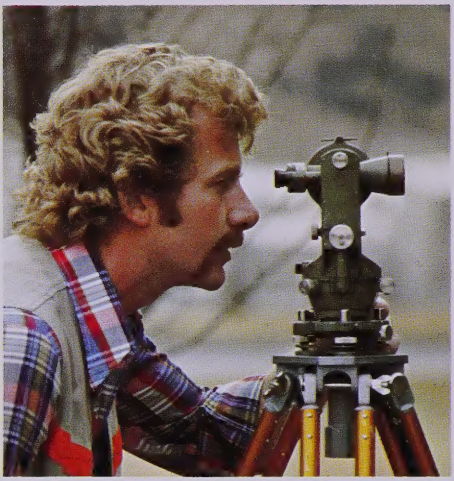
INTEGRATED SYSTEM LOADS AND RESOURCES 1980/81 - 1989/90

NOTE: All Hydroelectric Plant Energy Capability Based On Critical Water Conditions.

TOMORROW'S CHOICES

Proposed Project	Ultimate Capacity (MW)	Ultimate Annual Capability Average Energy (Millions of kWh)	Estimated Economic Rank	Years of Future Load Growth Served
Kootenay Diversion	—	810	1	0.3
Peace Site C	900	4 570	4	1.9
Alcan Purchase	780	up to 5 500	N/A	2.3
Hat Creek Thermal	2 000	11 400	6	4.8
East Kootenay Thermal	600	3 680	7	1.5
Murphy Creek Hydro	400	2 100	5	0.9
Stikine-Iskut Hydro	2 690	14 100	3	5.9
Liard Hydro	4 640	24 400	2	10.2

Note: Economic ranking takes into account the cost of fuel for thermal plants



POSSIBLE SEQUENCE

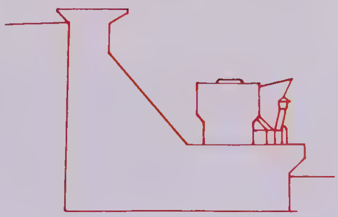
Project		Comments
Oct. 1987	Peace Site C	Earliest in-service; flooding of some agricultural land.
Oct. 1989	Murphy Creek	Feasibility to be established this year; project would involve relocation of homes and service facilities in Castlegar area.
Oct. 1989	Hat Creek Thermal	2000 MW plant. Uncertainties related to air emission regulations.
Oct. 1991	Stikine-Iskut Hydro	Earliest in-service date. Project now under study; impact on scenic value of Stikine Canyon.
Oct. 1994	Liard Hydro	Now under study. Requires solution of native Indian claims; probable flooding of Liard River Hotsprings Provincial Park and problems with proposed gas and oil pipelines from Alaska.

WHAT IT WILL COST

Not only do we ask "Can we build it?" We must also ask "Can we pay for it?"

The amount which must be raised to build new plant to meet future load demand is estimated to be $16.4 billion. Opposite is a breakdown of electric service by category showing how and where the money would be allocated.

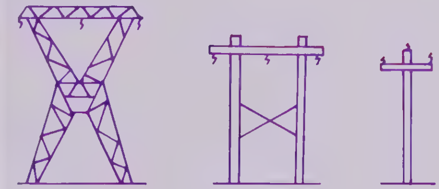
These expenditures offer both short-term and long-term benefits to British Columbia. Hydro's debt is backed by revenue-producing assets which are currently valued at far in excess of the debt. Simply stated, the debt is like a mortgage on a dam or a generating station. It is paid off from revenues produced over the long service life of these facilities.



GENERATION — $9.006 billion

Regional breakdown:

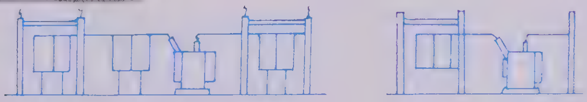
Metropolitan	— $1 million
Fraser Valley	— $3 million
Central Interior	— $2.610 billion
North Coast	— $1.964 billion
South Interior	— $4.417 billion
Vancouver Island	— $11 million



TRANSMISSION — $3.278 billion

Regional breakdown:

Metropolitan	— $791 million
Fraser Valley	— $209 million
Central Interior	— $504 million
North Coast	— $434 million
South Interior	— $779 million
Vancouver Island	— $561 million



SUBSTATIONS — $1.288 billion

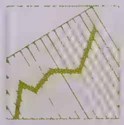
Regional breakdown:

Metropolitan	— $386 million
Fraser Valley	— $138 million
Central Interior	— $103 million
North Coast	— $256 million
South Interior	— $240 million
Vancouver Island	— $165 million

DISTRIBUTION — $1.442 billion

Regional breakdown:

Metropolitan	— $382 million
Fraser Valley	— $232 million
Central Interior	— $287 million
North Coast	— $ 62 million
South Interior	— $206 million
Vancouver Island	— $273 million



OTHER — $764 million

Regional breakdown:

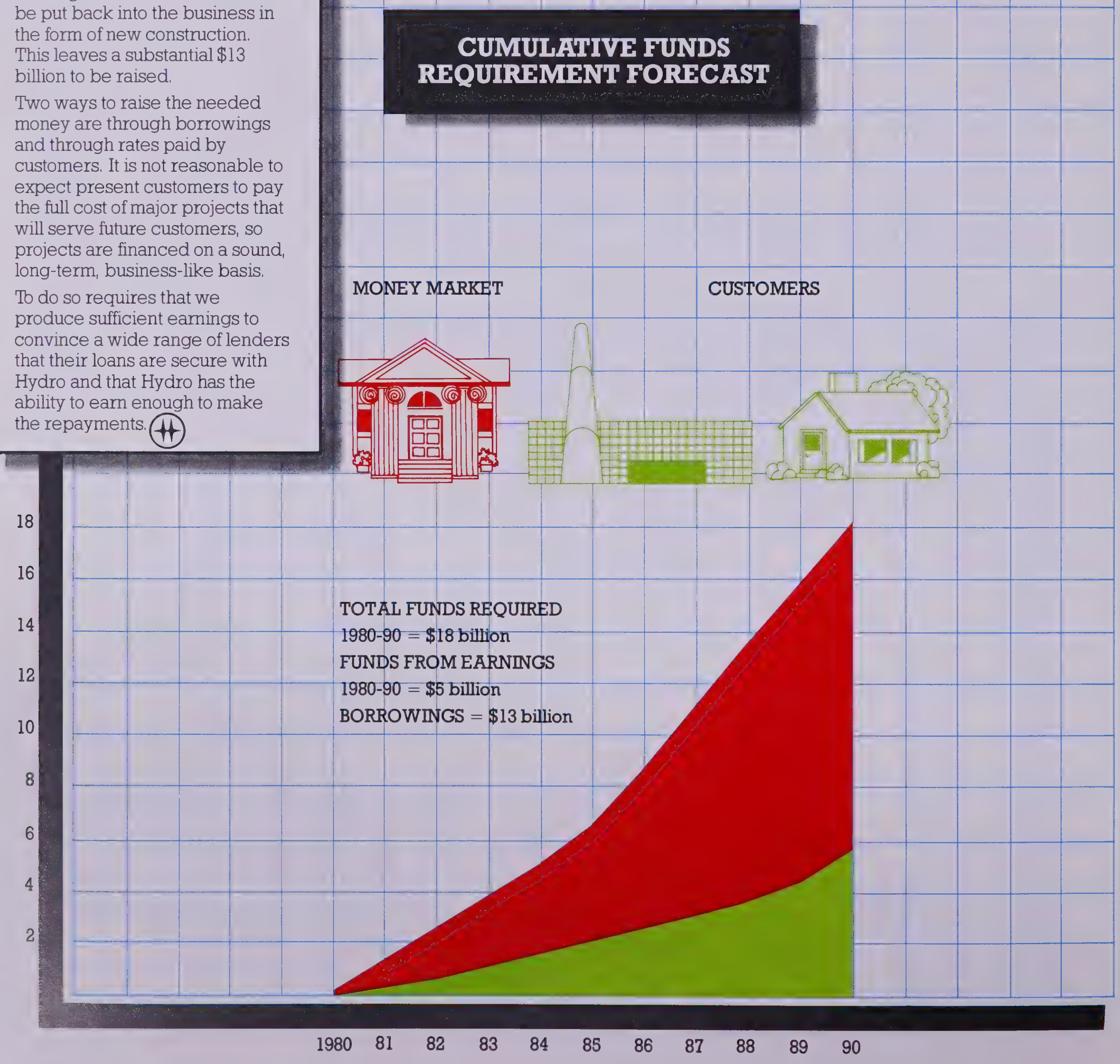
Metropolitan	— $428 million
Fraser Valley	— $ 40 million
Central Interior	— $ 85 million
North Coast	— $ 90 million
South Interior	— $ 88 million
Vancouver Island	$ 33 million

HOW TO PAY FOR IT

First, from earnings. In the next ten years Hydro will provide about $5.3 billion internally. Of this amount, $1.9 billion will be used to retire existing debt. The remainder will be put back into the business in the form of new construction. This leaves a substantial $13 billion to be raised.

Two ways to raise the needed money are through borrowings and through rates paid by customers. It is not reasonable to expect present customers to pay the full cost of major projects that will serve future customers, so projects are financed on a sound, long-term, business-like basis.

To do so requires that we produce sufficient earnings to convince a wide range of lenders that their loans are secure with Hydro and that Hydro has the ability to earn enough to make the repayments.



WHERE TO BORROW

Inflation puts a burden on B.C. Hydro just as it does on every citizen in the province. Twenty years ago Hydro borrowed money at about 5 per cent. In 1976 the rate was 10 per cent. In 1980, rates in excess of 13 per cent have been experienced. A difference of just one-half of one per cent on a $100 million bond issue over 20 years amounts to $10 million in interest costs.

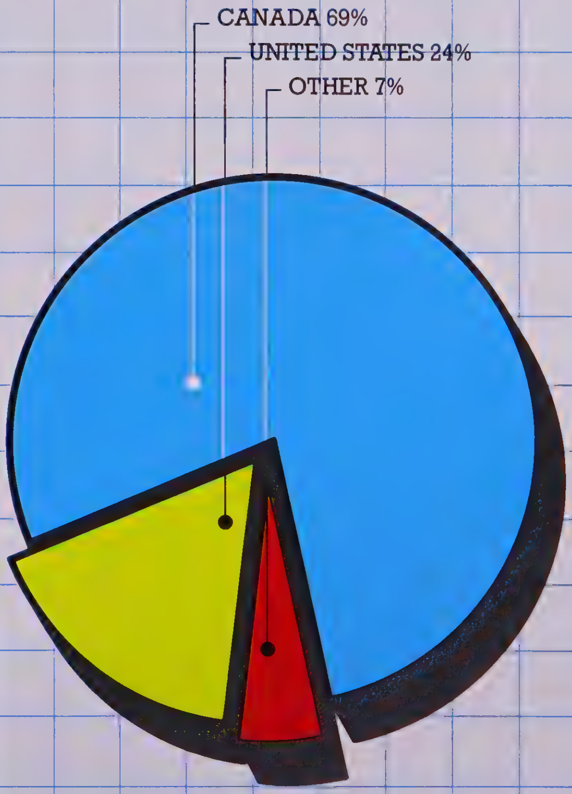
Primarily, borrowings take the form of long-term bonds (20-30 years) sometimes through an issue to the public, sometimes through a private placement arranged by brokers and sometimes from government trusteed funds.

Hydro usually looks first to Canada as a source of funds, but the Canadian market is not large enough to provide all of Hydro's needs. Therefore we must go elsewhere — mostly to the United States, but also to Europe. This is where Hydro's credit rating, based upon expert independent assessment of our financial stability, becomes a vital factor.

Currently, B.C. Hydro has the highest possible rating of Triple A from Moody's Investors' Service Inc. and from Standard and Poors.

To put Hydro's spending into perspective, it is useful to consider it in relation to the Gross Provincial Product (GPP). While capital and operating expenditures have been growing each year and now amount to more than $1.5 billion annually, they have remained for several years relatively constant as a percentage of the GPP, at roughly five per cent. In fact the percentage was higher in the early 1960s than it is today.

BONDS ISSUED BY B.C. HYDRO



Average interest rate of all borrowings is 8.61% at March 31, 1980.

GAS

Gas sales currently account for 18 per cent of B.C. Hydro's revenues, and gas is expected to play an increasingly important part in meeting your energy needs over the next ten years.

Hydro provides natural gas service to British Columbians in the Lower Mainland and the Fraser Valley and butane/airmix gas for Vancouver Island customers. The possibility of extending natural gas service to Vancouver Island is being studied.

Probable growth rate for natural gas sales on the Lower Mainland through 1989/90 is currently estimated at 3.8 per cent.

Conversions from oil heating to gas heating by residential customers are increasing significantly due to cost benefits and supply assurances. The Provincial Government estimates that natural gas from proven reserves in B.C. will last well into the 21st century.

One of B.C. Hydro's principal corporate strategies is continuance of the systematic and orderly expansion of gas distribution facilities to meet increasing demand. It is estimated that the cost of this expansion will exceed $500 million over the next ten years.

SUMMARY

1. B.C. Hydro is responsible for providing energy to meet the needs of British Columbians.
2. Hydro is responsible for estimating what those needs will be and of meeting them with a plan that ensures the future prosperity of the Province and its citizens.
3. Hydro has the technical and financial ability to carry out that plan with due regard for the economic and environmental well-being of all British Columbians.
4. Hydro pursues a policy of continual study of all sources of energy and supports development of technologies that will make those sources economically viable for use by British Columbians.
5. Hydro's current ten-year plan is based upon an estimate of your energy needs. This estimate is reviewed annually and the plan is amended to suit changing circumstances. In a given year, there may be only one major plant decision made. Even that can be changed or delayed if conditions demand it. It is a flexible plan designed to meet your needs.
6. Hydro welcomes the co-operation and understanding of British Columbians in its efforts to ensure that their needs are met.

GLOSSARY

Capability: the amount of energy a generating plant can produce in a given time (usually a year). For a hydro plant it relates not only to the size of the generating equipment but also to the availability of water (e.g. with a small amount of water available the plant could be operated at capacity for a short time, then closed down or output greatly reduced so the average level of energy production would be much less then the plant capacity.)

Capacity: the level of output in kilowatts of a generating plant when all the units are operating "wide open".

Circuit: a system of conductors through which an electric current is intended to flow.

Generator: a machine that converts mechanical power into electric power.

Head: difference in height between the water level in the reservoir and the turbine outlet. This influences the amount of energy a flow of water can produce.

Load Forecast: an estimate of customers' electricity needs at some future time.

Penstock: tube through which water flows from reservoir to the turbine in a hydroelectric generating station.

Run of the River Project: a hydroelectric generating station utilizing the instantaneous flow of a river (usually regulated by upstream developments) rather than its own storage reservoir.

Spillway: a chute, usually of concrete, to discharge excess water from a reservoir.

Streamflow: the quantity rate of water passing a given point in a stream or river.

Turbine: in an electric generating station, a rotating device spun by water, steam, gas or air and which is connected to a generator.

ac (alternating current): an electric current that reverses its direction of flow at regularly recurring intervals of time (usually 60 times per second in North America).

dc (direct current): an electric current which, under normal conditions, flows in one direction only.

V (volt): the unit of electric pressure.

kV (kilovolts): 1000 volts.

W (watt): the basic unit of electric power, expressing the rate at which electric energy is being expended.

kW (kilowatts): 1000 watts.

kW.h (kilowatt-hour): a unit of work or energy equal to that expended by one kilowatt in one hour.

MW (megawatts): 1000 kilowatts, or 1 000 000 watts.

GW.h: one million kilowatt hours.

km^2 (square kilometres): a metric unit of area measuring 1000 m by 1000 m.

m^3 (cubic metres): a metric unit of volume.

m^3/s (cubic metres per second): a unit of flow.

B.C. HYDRO

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Introduction.

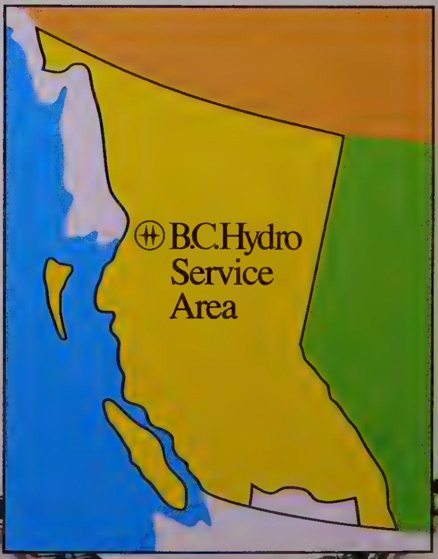
B.C. Hydro has a responsibility to meet the demand for electricity of its customers in British Columbia.

Hydro now supplies about 93 per cent of the provincial population with electricity. Under the provincial government's new energy policy for B.C., Hydro will serve almost all the future electric load growth in British Columbia.

The growth rate of electric demand is forecast to increase by 6.1 per cent annually in the 11 years from April 1, 1980 to March 31, 1991. Hydro must keep pace with anticipated industrial development and the lifestyle expectations of the people of British Columbia. Projects now under construction are insufficient to meet expected demands beyond the mid-1980s.

It is vital to industry, to government and to the public that we plan today to meet customer requirements 10 or more years hence.

This booklet discusses electric supply and demand today and in the future and draws from that discussion Hydro's recommendations for action to ensure supply will be sufficient to meet demand.



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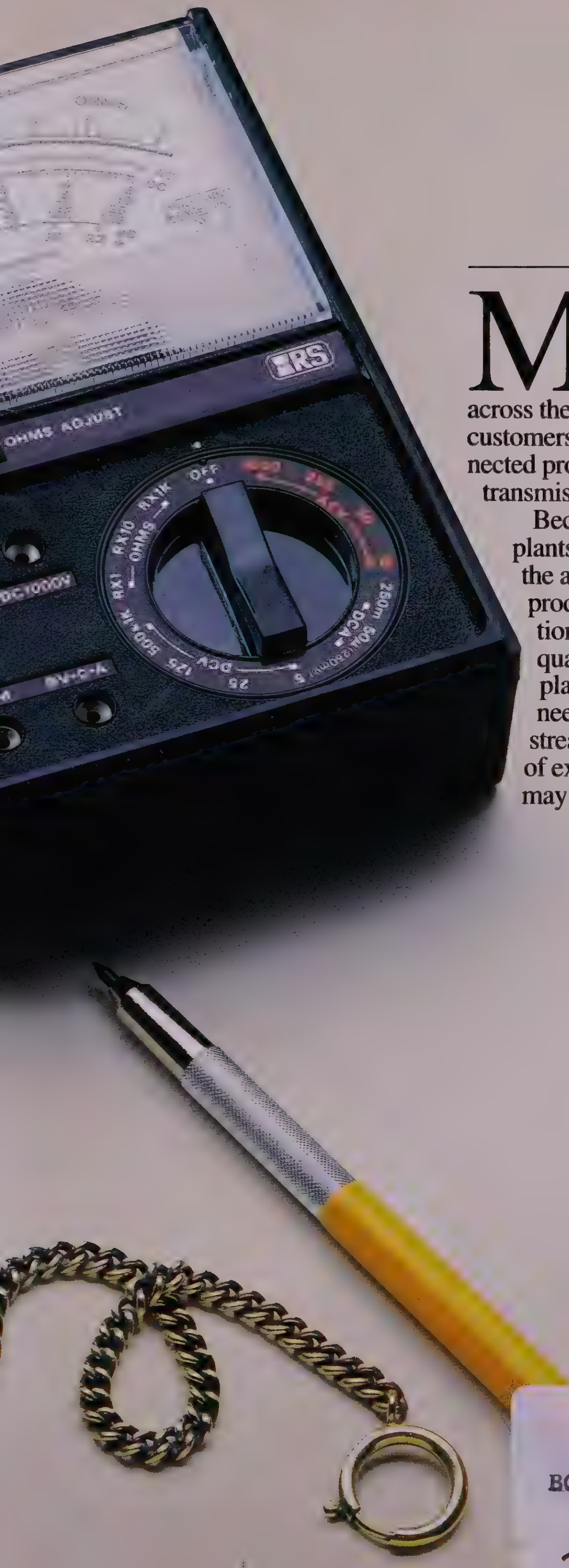
What we have.

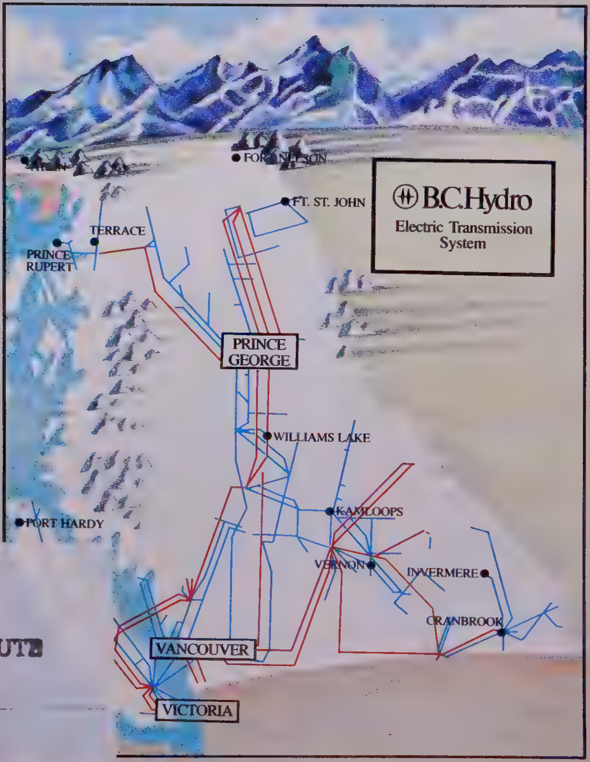


Most electricity consumed in British Columbia today is produced at Hydro's 32 hydroelectric plants across the province and reaches customers through an interconnected province-wide system of transmission lines.

Because these hydroelectric plants are "fuelled" by water, the amount of electricity they can produce fluctuates with precipitation variations. To ensure adequate supply at all times, Hydro plans to meet B.C.'s electric needs under critical (driest) streamflow conditions. In years of excess water, therefore, we may have surplus electricity to sell in the export market. It makes sense to generate electricity from the surplus water rather than to spill it.

Hydro's existing system has a total nameplate capacity, or manufacturer's rating, of 8.8 million kilowatts (kW), as of March 31, 1981.

The Burrard thermal generating plant is used to supplement the hydroelectric system under emergency conditions. Because the plant is gas-fired, the electricity it produces costs more than that produced by hydroelectric plants.



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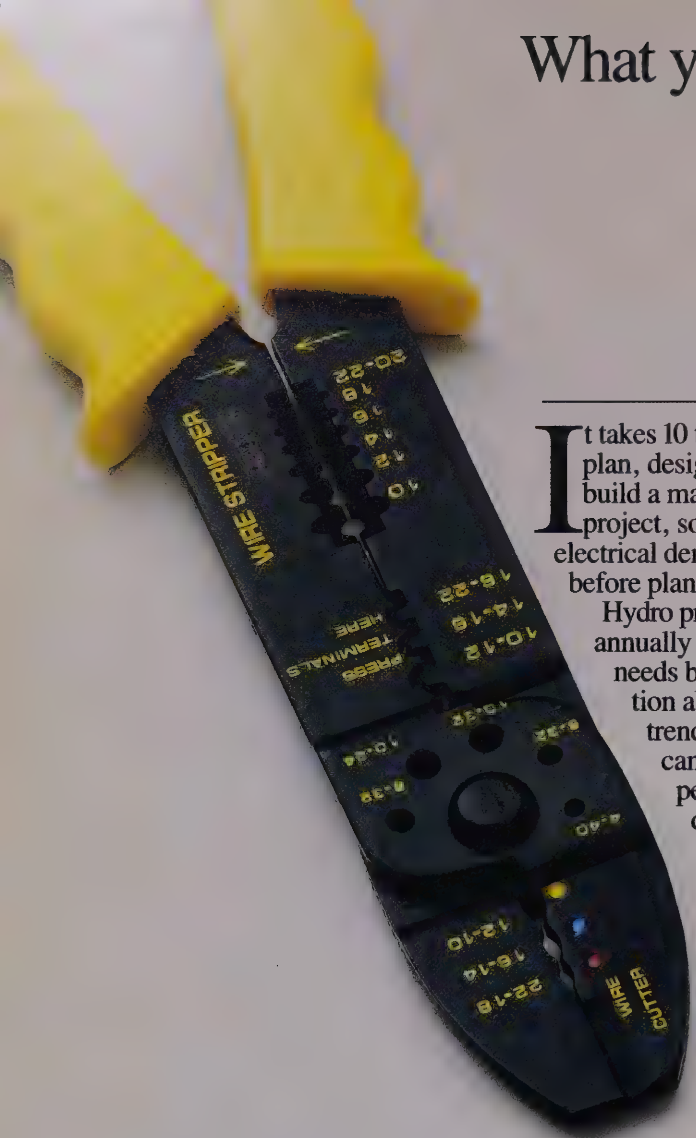
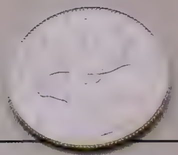
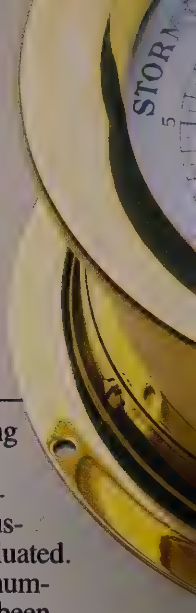
What you need.







It takes 10 to 15 years to plan, design, license and build a major hydroelectric project, so careful estimates of electrical demand must be made before planning can begin.

Hydro prepares a load forecast annually which estimates electric needs by combining information about past and current trends and projecting what can reasonably be expected to happen in the decade ahead.

District managers consult local governments, business and industry representatives. The data is compiled and analyzed. In addition, expansion plans of existing large industrial customers are analyzed. Inquiries related to possible new industrial development are evaluated. In the past two years the number of these inquiries has been substantial. Only about 10 per cent of this potential new load was allowed for in our last annual forecast.

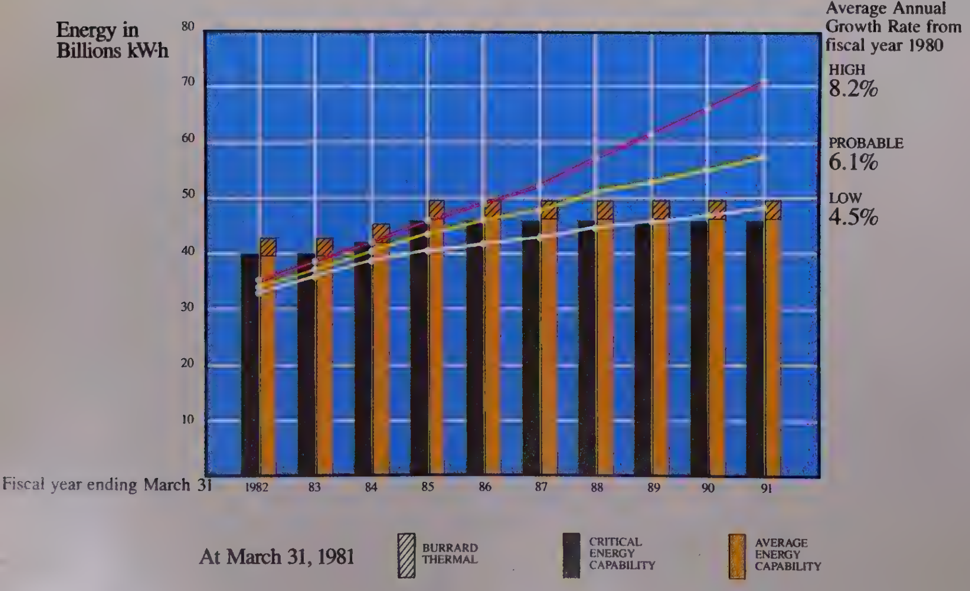
Government policy, changing lifestyles and the conservation ethic also are considered. Export of electricity is not included in the forecast.

Each year Hydro reviews and revises the forecast in light of current economic conditions and updated predictions. This annual revision is accompanied by a corresponding adjustment of system plans where necessary.

Hydro's current load forecast indicates that the need for electricity in the province will probably grow at an average annual rate of 6.1 per cent from April 1, 1980 to March 31, 1991. The forecast reflects Hydro's undertaking to provide electricity to West Kootenay Power and Light starting in 1981/82 when their customers' demands are expected to exceed that utility's generating capacity. Also included are significant amounts of electricity for Cominco starting in 1986/87 under the Kootenay Canal agreement. Excluding West Kootenay and Cominco requirements, the load forecast for B.C. Hydro alone is 5.6 per cent.

Hydro cannot be certain of meeting these requirements from its own resources from 1986 until proposed new electric generating projects at Site C and Hat Creek or their equivalents are in place.

Committed system capability compared to forecast

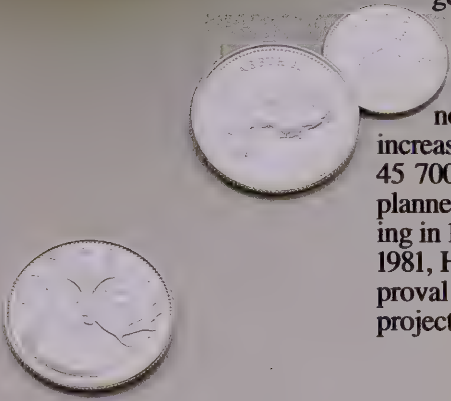


What we need.

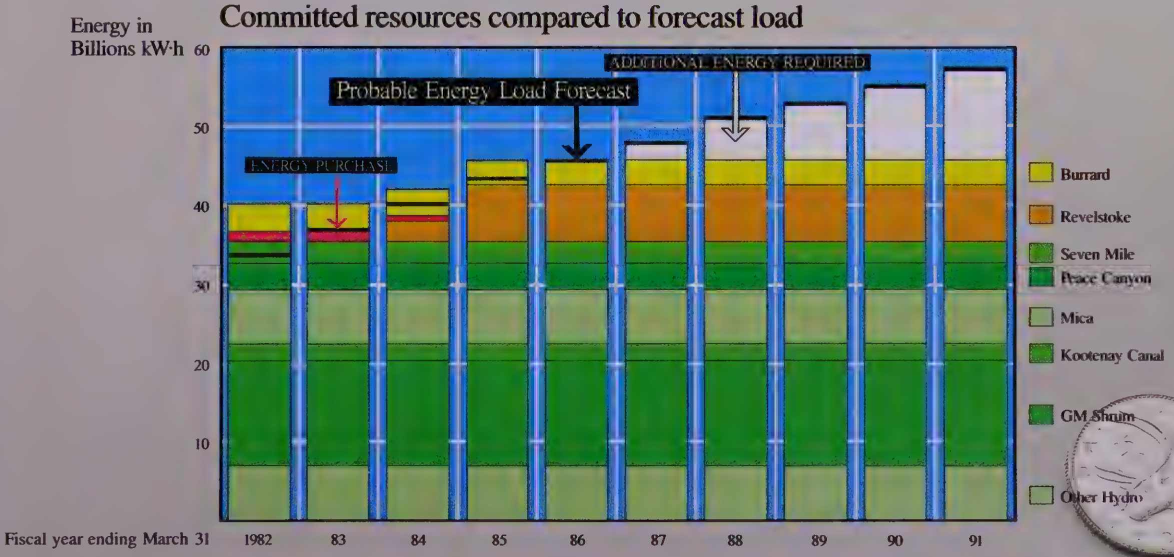
Even with Burrard thermal generating plant operating, Hydro's committed system cannot meet forecast loads under all streamflow conditions after 1985.

The demand for electricity is projected to reach 45 790 GW·h by 1985/86. Currently installed generation can assure only 38 820 GW·h per annum.

The Revelstoke project is the only major generating project now under construction and will increase the power supply in B.C. to 45 700 GW·h by the time the four planned generating units are operating in 1984/85. As of March 31, 1981, Hydro had not received approval to construct another major project.



Committed resources compared to forecast load



Note: All hydroelectric plant energy capability based on critical water conditions.

At March 31, 1981

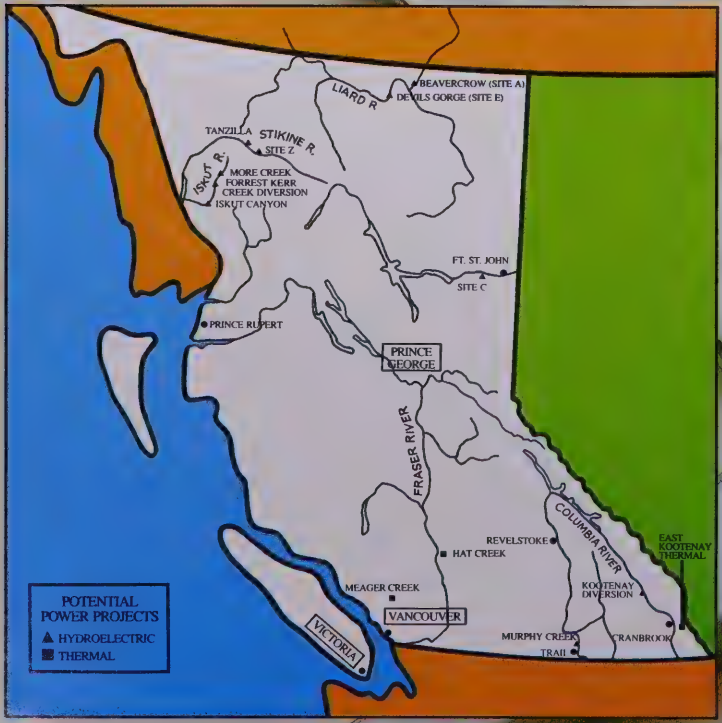
Where we will get it.

B.C. Hydro's generating alternatives are confined to those energy sources which meet four basic criteria. They must:

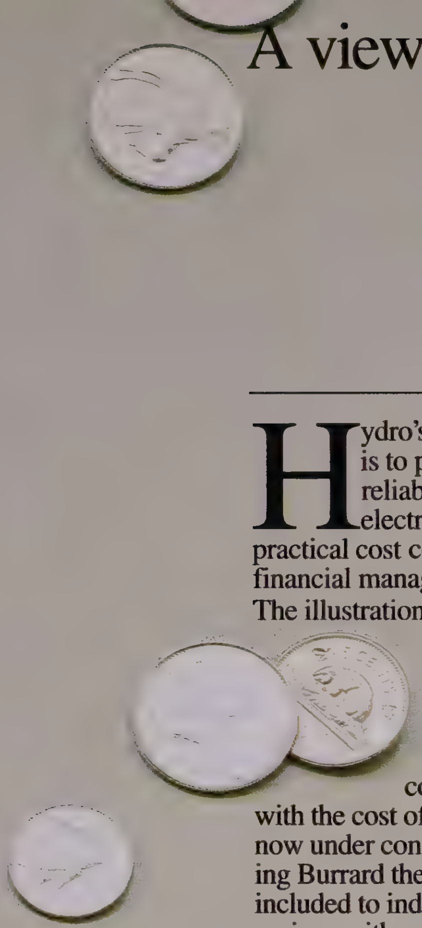
- be in British Columbia;
- have a well-developed technology;
- be cost competitive with other available energy sources;
- be acceptable to the provincial government and the public.

Although Hydro is studying sources such as solar, wind and tidal energy, they are not developed to the point where they can supply sufficient economic electricity to meet demand. Geothermal energy may prove to be an economic source of electricity. Exploratory drilling now under way in the Meager Creek area could demonstrate the feasibility of this resource.

In practical terms, the Site C hydroelectric development on the Peace River and Hat Creek coal-fired thermal plant appear to be Hydro's only available alternatives to bring new power on line in time to avoid extending the anticipated electricity shortage which could occur with low streamflows into the late 1980s.

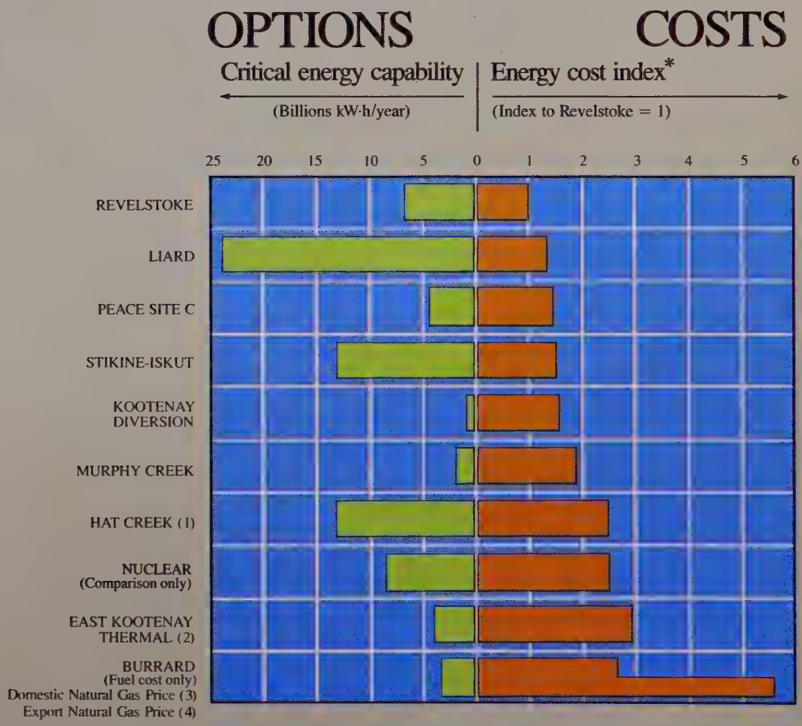


A view of the costs.



Hydro's general policy is to provide a secure, reliable supply of electricity at the lowest practical cost consistent with sound financial management.

The illustration shows the economic ranking of potential projects. The energy cost index provides a comparison of the expected unit energy costs of these projects with the cost of the Revelstoke plant now under construction. The existing Burrard thermal plant is included to indicate a cost comparison with potential hydroelectric and thermal plants.



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1. Cost based on design with wet flue gas desulphurization (0.27 mg/kJ SO_2 Emission level).
2. Cost based on design with Meteorological Control System (MCS) without flue gas desulphurization.
3. Cost based on estimated (Nov. 1980) domestic price for natural gas.
4. Cost based on current export price for natural gas.

* **NOTE: All energy costs are compared with energy cost for the Revelstoke Project (4 units) on the Columbia River (i.e. Revelstoke has an energy cost index of 1.0).**

How we will get it.

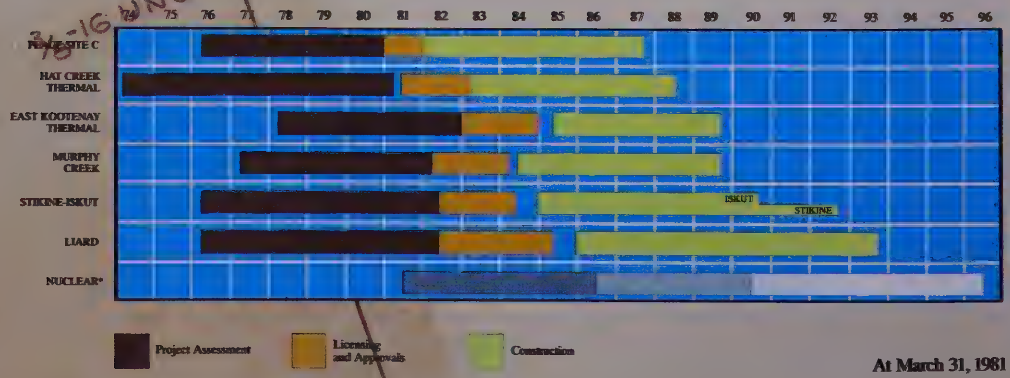
Hydro is studying several projects to meet forecast demands. The illustration shows the status of each project. Until feasibility and detailed engineering and environmental studies are completed, no decision is made on whether or not to seek approval for licensing. In addition to several permits and licences, Hydro must apply for an energy project certificate from the Ministry of Energy, Mines and Petroleum Resources. The government may refer the application to the B.C. Utilities Commission, and the Commission would then hold a public hearing. Although it would be desirable to bring Site C project into service by October 1986 in order to meet forecast demands, it now appears October 1987 would be the earliest in-service date. An application for an energy project certificate for Site C was submitted in September 1980 and a hearing is expected to begin about mid-1981.

The alternatives.

The number of feasible projects for early development is limited. The earliest feasible in-service dates of major generation projects that Hydro is considering for future construction are shown below:

	Project	**Earliest In-Service Date**	**Nominal Generation Capacity (MW)**	**Average Energy (GW·h/a)**	**Firm Energy (GW·h/a)**
Hydro:	Peace Site C	October 1987	900	4 610	4 660
	Murphy Creek	October 1989	400	1 870	1 780
	Iskut Sites	October 1990	935	4 320	4 050
	Stikine Sites	October 1992	1 830	10 860	8 970
	Liard Sites	October 1993	4 760	26 090	23 900
Thermal:	Hat Creek	August 1988	2 000	11 400	13 140
	East Kootenay	October 1989	600	3 420	3 940

Earliest feasible in-service dates



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*Nuclear planning schedule is shown for comparison only.

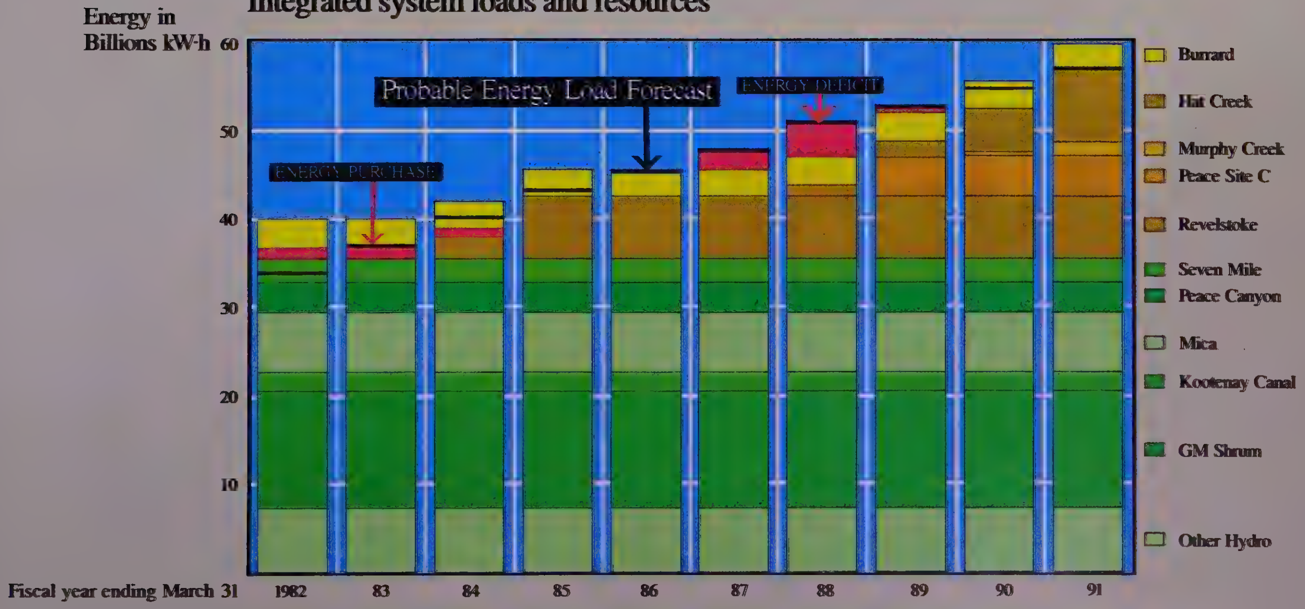
What it all means.

By operating the Burrard thermal plant, Hydro could meet the 1985/86 load, but not the 1986/87 load if critical water conditions occurred. Significant supplies of additional electricity must be found until the combined output of Site C and Hat Creek could be brought on stream.

If forecast demands are met or surpassed in a critical water year, Hydro would be unable to meet B.C.'s electric needs after 1985/86. This situation will be relieved somewhat, but not entirely, if Site C and Hat Creek are licensed and come on line by mid-1988.

Any delays in licensing of Site C and Hat Creek would aggravate the energy supply situation. While we have an agreement to purchase energy from Alcan extending until December 1983, at this time we have no assured source of firm energy from Alcan or other utilities beyond that date.

Integrated system loads and resources



Note: All hydroelectric plant energy capability based on critical water conditions.

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How you can help.

Conservation of electricity can help to reduce the pressure on the B.C. Hydro system in future.

For example, as a result of conservation efforts by commercial and small industrial customers, our current load forecast assumes that the growth of all new loads in that category coming on line after 1982/83 will be reduced by some 20 per cent below a ''no conservation'' growth rate. These reductions have resulted in considerably lower projections for this class of customer.

Hydro has representatives throughout its service area to advise residential, commercial and industrial customers on ways to economize through efficient use of electricity. Hydro also conducts industrial management seminars to provide practical advice on effective measures to use energy efficiently in plants and buildings.

What it will cost.

The cost of building major new projects and other related fixed asset expenditures in the period from 1981-1991 is estimated to be $22.6 billion, including overhead, interest during construction and allowance for future inflation.

These expenditures offer both short-term and long-term benefits to British Columbia. Hydro's debt is backed by revenue-producing assets which have current and forecast values in excess of the debt.

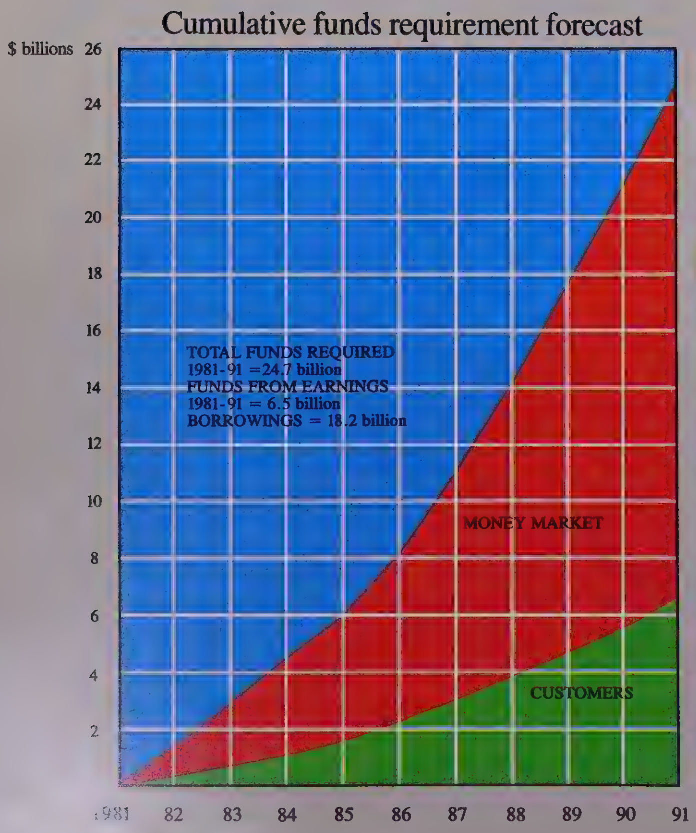
Simply stated, the debt is like a mortgage and is paid off from revenues produced over the service life of the facilities.

How to pay for it.

Funds are raised through borrowings and through rates paid by customers.

In the next 10 years we project that about $6.5 billion of the total funds required will be provided from operations. Of this amount $2.1 billion will be used to retire existing debt. The remainder will be re-invested in the business. With the cost of new fixed asset expenditures over the 10 years being estimated at $22.6 billion, this leaves $18.2 billion to be borrowed.

Rather than burden today's customers with tomorrow's costs, we amortize the debt over the long service life of the new facilities. Traditionally Hydro's rates are structured to cover the servicing of the debt along with other operating costs. Under the new provincial energy policy, B.C. Hydro's rates are regulated through the B.C. Utilities Commission.


Cumulative funds requirement forecast

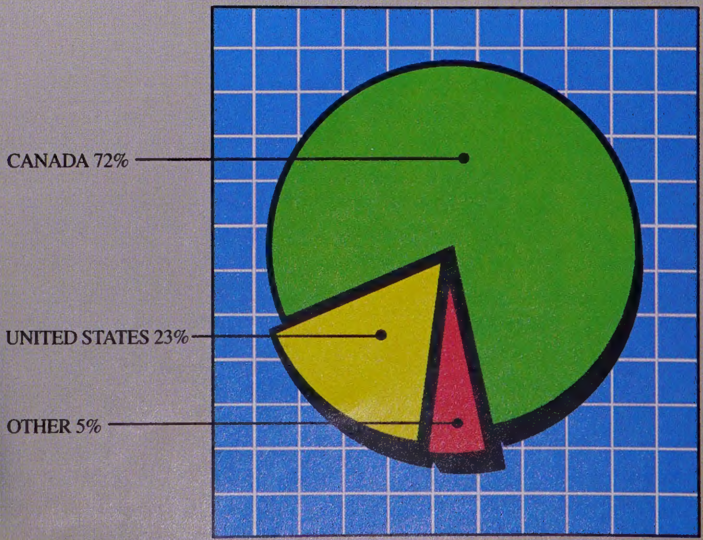
Where to borrow.

Most borrowing takes the form of long-term bonds (20 to 30 years), through government trusteed funds, issues to the public, or through private placements arranged by brokers.

Hydro usually looks first to Canada as a source of funds, but on occasion we must go elsewhere — usually to the United States, but also to Europe. Hydro's credit rating is a vital factor in attracting investments from these sources.

Hydro has the highest possible rating: triple A from Moody's Investors Service and from Standard & Poor's Corporation, the two major financial rating agencies in the U.S.

Bonds issued by B.C. Hydro



Average interest rate of all borrowings is 8.85% at March 31/81.

Conclusion.

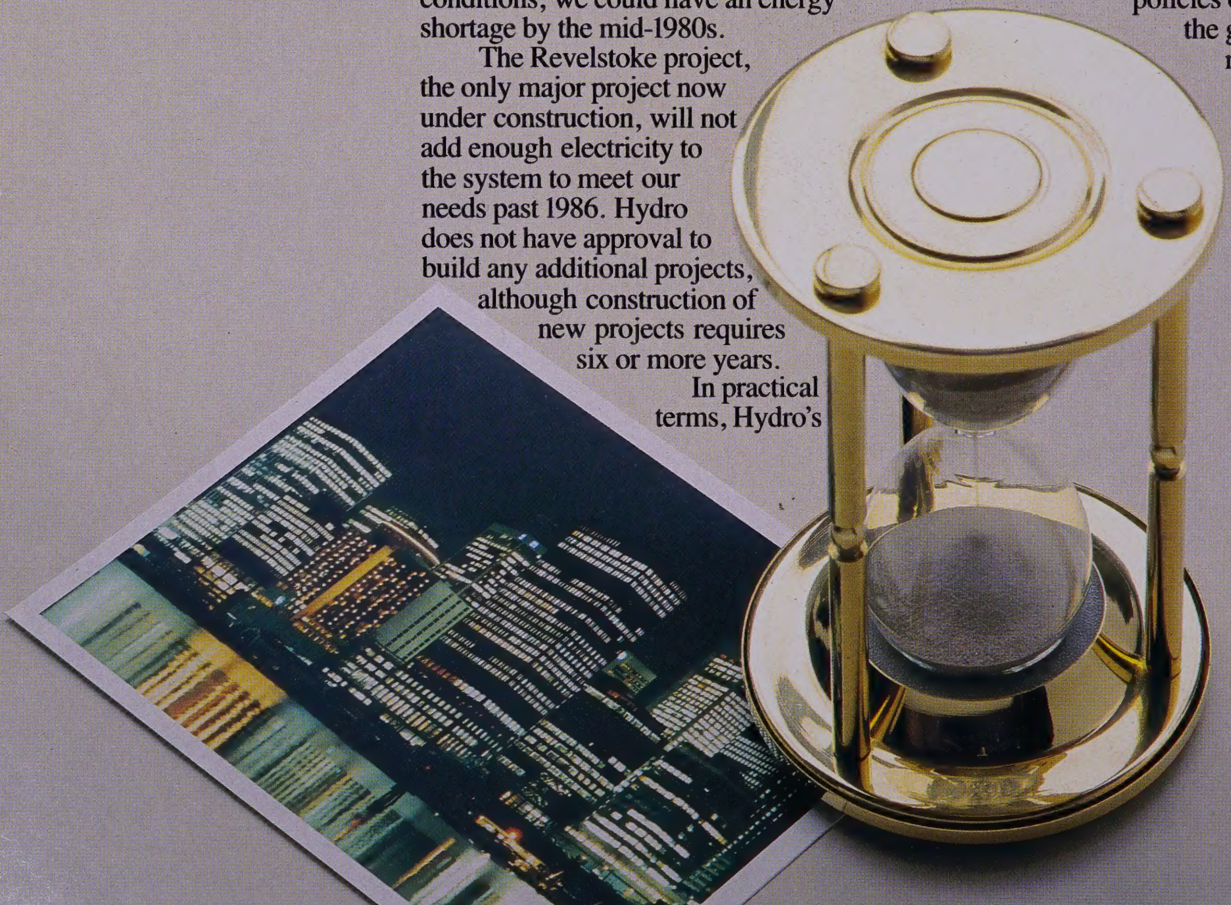
Hydro's load forecast indicates an annual growth in electric demand in British Columbia of 6.1 per cent over the 11 years from April 1, 1980 to March 31, 1991.

If this forecast is met or surpassed and if British Columbia experiences critical streamflow conditions, we could have an energy shortage by the mid-1980s.

The Revelstoke project, the only major project now under construction, will not add enough electricity to the system to meet our needs past 1986. Hydro does not have approval to build any additional projects, although construction of new projects requires six or more years.

In practical terms, Hydro's only feasible projects to meet growing electrical needs in the middle to late 1980s are the Site C hydroelectric development on the Peace River and Hat Creek coal-fired thermal generation.

Hydro has the technical and financial ability to build the projects that will ensure British Columbians a secure energy future, while at the same time maintaining the social, economic and environmental policies of the government.



Glossary.

Capability:
The amount of energy a generating plant can produce in a given time (usually a year). For a hydro plant it relates not only to the size of the generating equipment, but also to the availability of water. For example, with a small amount of water available the plant could be operated at capacity for short time, then closed down or output greatly reduced so the average level of energy production would be much less than the plant capacity.

Capacity:
Maximum rated output of a machine, apparatus or station.

Critical Water Conditions or Critical Water Sequence:
A period of adverse streamflows which actually occurred in the past. It is expected that critical water periods may recur at any time in the future, and would cause all hydroelectric reservoirs then in operation to be drawn down to minimum levels in order to sustain service to firm loads. Critical water conditions thus serve as a design test of the capability of a hydroelectric system to meet forecast electric loads under adverse reservoir inflows.

Flue Gas Desulphurization:
Process, often called ''scrubbing'', of removing sulphur dioxide from gases given off by combustible material containing sulphur, such as coal.

Load Forecast:
An estimate of the customers' power and energy consumption at some future time.

Streamflow:
The volume of water passing a given point in a stream or river in a given period of time.

Abbreviations.

W (watt): the basic unit of electric power, expressing the rate at which electric energy is expended.

kW (kilowatts): 1 000 watts.

kW·h (kilowatt-hour): a unit of work or energy equal to that expended at the rate of one kilowatt in one hour.

GW·h (gigawatt-hour): 1 000 000 kilowatt-hours.

MW (megawatts): 1 000 kilowatts or 1 000 000 watts, a measure of electric power.

mg/kJ SO_2: measurement of the weight of sulphur dioxide per thousand units of heat produced from burning coal.

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